

Matus, Tim A.

S/N: 10/605,038

**In the Claims**

What is claimed is:

1. (~~Presently Amended~~) A plasma cutting system comprising:  
a plasma cutting power source;  
a plasma torch operationally connected to the plasma cutting power source; and  
a serialization circuit disposed within the plasma torch to control transmission of  
multiple feedback signals ~~between~~ the plasma torch ~~and~~ the plasma cutting power source.
2. (Original) The plasma cutting system of claim 1 further comprising a plurality of sensors configured to provide feedback signals to the plasma cutting power source.
3. (Original) The plasma cutting system of claim 2 wherein the serialization circuit is configured to serialize feedback from the plurality of sensors to the plasma cutting power source.
4. (Previously Presented) The plasma cutting system of claim 2 wherein the plurality of sensors includes at least two of a power source activation indicator, an electrode type indicator, a tip type indicator, a cup position indicator, a consumable indicator, a shorted component indicator, an air pressure indicator, a temperature indicator, a trigger position indicator, a trigger safety indicator, an operation amperage indicator, a current transfer indicator, and a voltage drop indicator.
5. (Original) The plasma cutting system of claim 1 further comprising a single communications link for transmission of multiple feedback signals to the plasma cutting power source.
6. (Original) The plasma cutting system of claim 5 wherein the single communications link is configured to translate power from the plasma cutting power source to the plasma torch.
7. (Original) The plasma cutting system of claim 1 further comprising an interrupt to transmit potentially problematic operating condition feedback to the power source bypassing the serialization circuit.

Matus, Tim A.

S/N: 10/605,038

8. (Original) The plasma cutting system of claim 7 wherein the potentially problematic operating condition feedback includes one of an over-temperature signal, a trigger release signal, and a consumable condition signal.

9. (Original) The plasma cutting system of claim 1 wherein the serialization circuit includes at least one of an analog serializing circuit and a digital serializing circuit.

10. (Original) The plasma cutting system of claim 1 wherein the plasma torch is configured to operate with a maximum open circuit output voltage of greater than 220 volts DC.

11. (Original) A method of providing feedback from a plasma torch to a remote power source, the method comprising:

- receiving feedback from a plurality of sensors disposed in a plasma torch;
- arranging the feedback in a queue; and
- sending the feedback to a remote power source in an order the feedback is arranged in the queue.

12. (Original) The method of claim 11 further comprising interrupting the queue when the feedback received is a safety condition feedback signal.

13. (Original) The method of claim 11 further comprising transmitting the feedback to the remote power source via a single communications link.

14. (Original) The method of claim 13 further comprising transmitting power to the plasma torch across the single communications link.

15. (Original) A plasma torch assembly comprising:

- a torch body enclosing a plasma-cutting electrode;
- a plurality of sensors disposed within the torch body and configured to provide feedback regarding at least operational conditions of a plasma cutting process; and
- a serializer disposed within the torch body to receive feedback from the plurality of sensors and configured to transmit the feedback to a remote processing unit via a single communications link.

Matus, Tim A.

S/N: 10/605,038

16. (Previously Presented) The plasma torch assembly of claim 15 wherein the plurality of sensors includes at least two of a power source activation indicator, a cup position indicator, a consumable indicator, a shorted component indicator, an air pressure indicator, a temperature indicator, a trigger position indicator, an operation amperage indicator, a current transfer indicator, and a voltage drop indicator.

17. (Original) The plasma torch assembly of claim 15 wherein the serializer includes a serialization circuit configured to send the feedback as discrete feedback signals to the remote processing unit.

18. (Original) The plasma torch assembly of claim 15 wherein the single communications link is a power-supply cable.

19. (Original) A method of manufacturing a plasma cutting torch comprising:  
constructing a housing;  
enclosing a plasma-cutting electrode within the housing;  
disposing a plurality of sensors within the housing to provide operational feedback regarding operational conditions of a plasma-cutting process;  
connecting the plurality of sensors to a serializing circuit such that feedback from the sensors is queued by the serializing circuit before being sent to a plasma-cutting power source.

20. (Original) The method of claim 19 further comprising disposing the serializing circuit within the housing.

21. (Original) The method of claim 19 further comprising disposing an interrupt of the serializing circuit within the housing to bypass the serialization circuit and transmit feedback indicating a potentially problematic operating condition to the plasma-cutting power source.

22. (Original) The method of claim 19 further comprising manufacturing the housing, plasma-cutting electrode, plurality of sensors, and serializing circuit to operate with a maximum open circuit output voltage of greater than 220 volts DC.